Kent Curtis

From: Kent Curtis

Sent: Friday, January 05, 2007 4:15 PM

To: CNEP-AirNow

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Subject: Analysis of VOC sample data

I have analyzed the data for our first seven VOC samples, which were collected from September 26 through October 26. The following is a summary of my analyses.

All 7 samples are valid samples, as the canisters had final pressures that were less than zero.

ERG analyzed each sample for 60 VOCs.

The number of VOCs detected in each sample ranged from 23 (October 26 sample) to 30 (October 10).

I compared the concentrations of detected VOCs to the following benchmarks:

EPA Region 6 Human Health Medium-Specific Screening Levels
  Chronic inhalation toxicity values (non-cancer and cancer values)
  Region 6 Screening values for ambient air
Oklahoma Department of Environmental Quality (ODEQ) MAACs
ATSDR Minimal Risk Levels (MRLs) for inhalation

4 to 7 detected VOCs equalled or exceeded one or more of these benchmarks in each sample. The VOCs exceeding these benchmarks were as follows:

Acrolein, exceeding a benchmark in 5 samples, with a concentration range in these five samples of 1.54 to 4.3 ug/m3.

Chloromethane, exceeding a benchmark in 5 samples, with a concentration range in these five samples of 1.1 to 1.49 ug/m3.

1,3-Butadiene, exceeding a benchmark in 3 samples, with a concentration of 0.04 ug/m3 in all three samples.

Chloroform, exceeding a benchmark in 5 samples, with a concentration of 0.10 ug/m3 in all five samples.

Benzene, exceeding a benchmark in all 7 samples, with a concentration range in these seven samples of 0.32 to 0.67 ug/m3.

Carbon tetrachloride, exceeding a benchmark in all 7 samples, with a concentration range in these seven samples of 0.63 to 1.01 ug/m3.

Trichloroethylene, exceeding a benchmark in 3 samples, with a concentration range in these three samples of 0.05 to 0.11 ug/m3.

Chloromethane and Chloroform exceeded only screening levels.

Benzene, carbon tetrachloride, and trichloroethylene exceeding both screening levels and cancer benchmarks.

1,3-Butadiene exceeded a cancer benchmark.

Acrolein exceeded both screening levels and a non-cancer benchmark. In addition, acrolein was the only VOC to

exceed both the ODEQ MAAC and the ATSDR MRL.

Results for the two duplicate samples collected on October 2 were good. Only 5 of the 28 detected VOCs had a relative percent difference (RPD) greater than 20%, and none of these 5 VOCs exceeded a benchmark.

The benzene/toluene ratios in the seven samples ranged from 0.58 to 1.68. These ratios are NOT characteristic of vehicular (gasoline engine) emissions.

The concentrations of carbon tetrachloride and chlorofluorocarbons [Dichlorodifluoromethane (freon 12), Dichlorotetrafluoroethane (freon 114), and Trichlorofluoromethane (freon 11)] detected in the seven samples were relatively stable. This is consistent with the fact that such VOCs have stable global background concentrations in the USA.

It's interesting to note that the two samples collected in Graseby canisters (on October 20 and 26) were the only two samples in which Acrolein was NOT detected. The other five samples were collected in Restek canisters. We have removed the two Graseby canisters from our sample canister rotation.

There was no discernible effect of excessive temperature on the sample collected on October 26. This canister had been exposed to a shelter temperature of > 130 degrees Fahrenheit when the air conditioner failed on October 24.

Finally, the wind direction on each of the 7 sample dates was consistently from the E, SE, S, SW, and/or W at speeds ranging from 1 to 9 mph. The Cherokee Heights tribal housing complex and the city of Locust Grove lie to the east and southeast of the Pryor monitoring station; U. S. highway 412 lies south of the station; and Mid-America Industrial Park lies to the west and southwest of the station. There was no rainfall on any of the 7 sample dates. Ambient air temperatures ranged from a low of 38 degrees F on October 20 to a high of 89 degrees F on October 2.

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